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The Vegetation History of Fort Frederica, Saint Simons Island, Georgia

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THE VEGETATION HISTORY OF FORT FREDERICA, SAINT SIMONS ISLAND, GEORGIA

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NATIONAL PARK SERVICE - Southeast Region

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ABSTRACT

Fort Frederica, Saint Simons Island, Georgia was settled by English colonists in 1736. The fort and surrounding lands have undergone ten major phases of disturbance and regrowth since pre-colonial times. Written descriptions by early observers such as John Wesley document the original predominance of evergreen oak - mixed hardwood forests on the upland portions of Saint Simons. Colonial records also document extensive marshes and ponds, including a pond just outside the walls of the fort. Activities during the plantation period led to the drainage of interior wetlands for agriculture and the replacement of oak forest by cotton fields and successional pine forest. Records indicate the Indians, settlers, and slaves used fire for clearing dense vegetation. The fire regime has probably changed since aboriginal times, with an increase in fire size and frequency during the plantation period followed by a decrease since the beginning of the 19th century. Although the forest around the fort is now returning to mixed oak - hardwoods similar to its pre-colonial state, the present landscape of the fort itself is largely a result of pre-Civil War agriculture and post-Civil War logging.

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INTRODUCTION

Fort Frederica National Monument, Saint Simons Island, Georgia, is an 80 hectare historic and archeological site under the supervision of the US National Park Service. James Oglethorpe, founder of the Colony of Georgia, originally selected the location for a walled town and garrison because of its easily defendable location on high ground next to the Frederica River. The site was occupied by civilians in 1736 and soldiers arrived in 1738. The fort served its military purpose in 1742 when the English troops stationed at Frederica defeated invading Spanish forces from Florida at the Battle of Bloody Marsh, which took place near the Military Road from Frederica to the south end of Saint Simons (see Fig. 1). The purpose of this project was to determine: 1) what the vegetation of Fort Frederica and environs was like in 1736, 2) how this vegetation has changed over the last 250 years, and 3) how present vegetation patterns compare to the historic pattern.

METHODS

The first phase of this project reviewed available historic and contemporary written documentation concerning the natural features and agricultural history of St. Simons Island. Obtaining copies of historic maps and coastal charts was given special emphasis. Various colonial records, travel accounts, diaries and collections of newspaper articles were investigated for references to: 1) plant species, 2) vegetation types, 3) fires, storms and other disturbances, 4) native animal species, 5) agricultural and logging practices, and 6) drainage and other forms of landscape modification.

The second phase of the project compared historic records to contemporary records and related current landscape features to events that potentially explained their origin. Present vegetation boundaries were, for example, compared to field boundaries on historic maps. Color infrared photography flown by the US Fish and Wildlife Service in 1978 (1:2000 scale), was used in conjunction with ground investigation to determine the pattern of contemporary vegetation.

The third phase of the project was a vegetation survey. The survey consisted first of ten 10 x 20 meter plots placed in the major vegetation types around the National Park Service property. Sampling included recording diameter at breast height (1.3 meters) for all woody stems greater than 1 centimeter in diameter and estimating cover for each herbaceous and woody species found in ten 1 x 1 meter understory quadrats, laid in two diagonal lines across the 10 x 20 meter plots. These sampling plots were supplemented by 23 canopy plots, surveyed for species composition using a one factor Bitterlich prism. The prism plots included mature oak forest across from nearby Christ Church, and successional pine forest outside the National Monument property. The canopy data were converted into importance values by computing the percentage of the total basal area for each species in a plot. Plots were grouped by the probable age of the stand. Stands were aged by counting rings on cut stumps and by increment boring. Botanical nomenclature follows Radford et al. (1974).

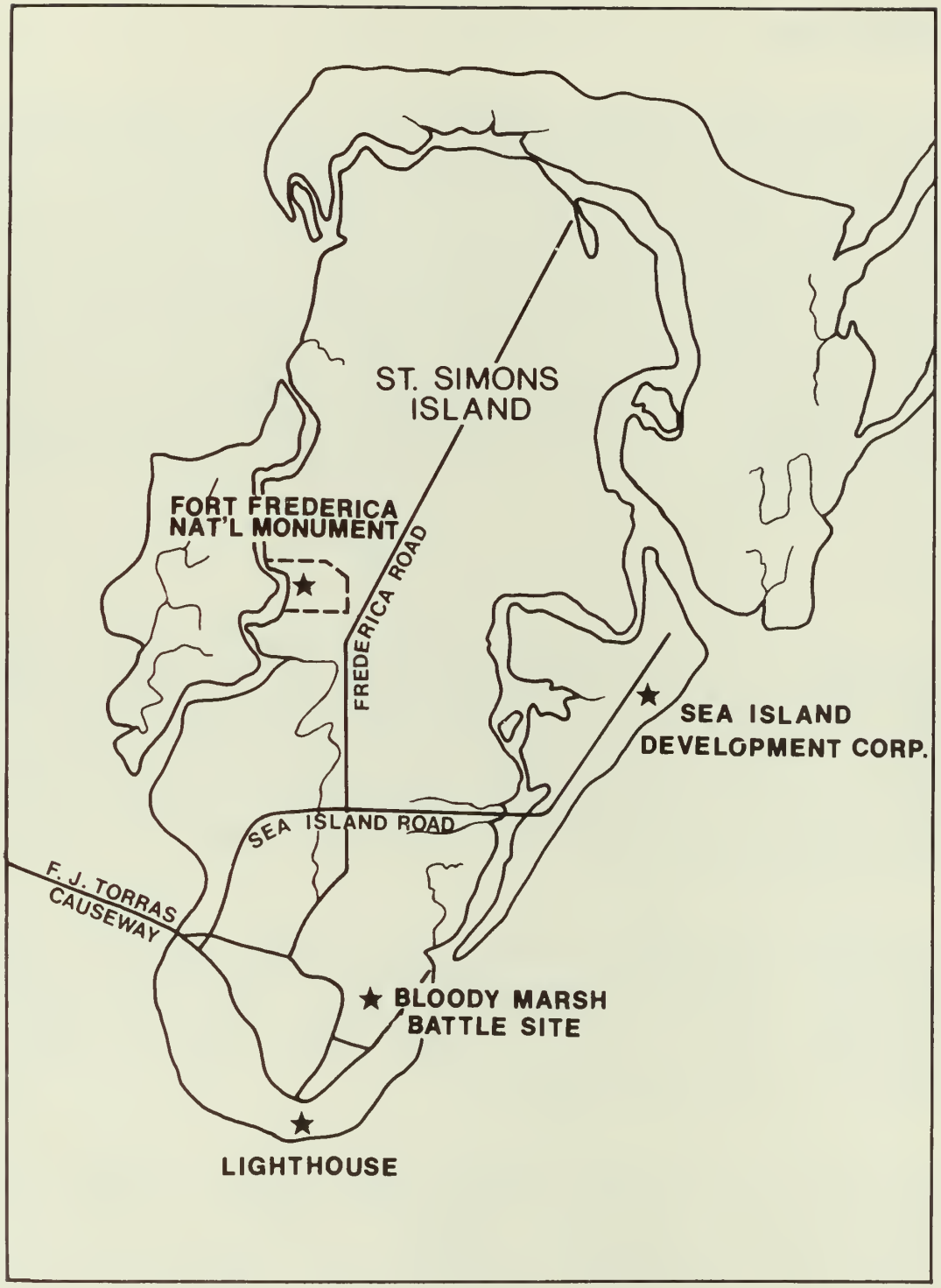

Figure 1. The position of Fort Frederica on St. Simons Island, Georgia. The location of the fort, the Military Road, the Battle of Bloody Marsh and major modern features are shown.

RESULTS

The Historic Records

The historic records indicate there were ten different periods of human interaction with the vegetation and the landscape in the Fort Frederica area. Anthropogenic disturbances and impacts varied from almost none, during times of abandonment, to the extensive logging and agriculture of the plantation era (Table 1). The periods and their documented effects are as follows:

1) Aboriginal agriculture. Before the coming of the Spanish, coastal Indian tribes occupied the Georgia Sea Islands. They harvested fish and shellfish, hunted and farmed small fields. If their behavior was similar to that observed in early colonial times, the Indians burned the marshes and the forest understories. Lacking metal axes, they probably left trees standing in their fields. (See English Settlement for further information on aboriginal fire and cultivation.)

2) Spanish missions. The Spanish established missions in the Georgia Sea Islands shortly after the founding of the city of St. Augustine in 1565. There was an active mission on the south end of St. Simons, but its location is presently unknown. The Spanish certainly introduced some European plant species and domestic animals but did not initiate agricultural or logging operations, other than the necessary fields and gardens in the immediate area of the missions. First Jesuit, and later Franciscan, missionaries attempted to consolidate their converts into towns around the missions, but apparently did little to change Indian agricultural techniques. It is probable that the wars, diseases and other cultural disruptions associated with Spanish occupation influenced the amount and location of Indian agricultural activity prior to the arrival of the English. The Spanish abandoned their effort to colonize the Sea Islands in 1686 (Vanstory 1970, Cate 1979).

English records have few mentions of landscape changes attributable to the Spanish. Francis Moore, in his diary recording the English arrival on St. Simons, describes an "Orange tree full of Fruit on Duboys Island" (Candler 1904 - 1916). The tree was so tall and thorny, it was necessary to cut it down to retrieve the oranges. Moore also noted peach and orange trees growing on Amelia Island. Fairbanks (1956) lists peach pits found in archaeological excavations of Fort Frederica, implying fruit from Spanish trees was utilized by English settlers about 1740. Other than these trees, and the use of the term "Spanish" for some old fields, this study found no mention of lingering Spanish influence on the Sea Island landscape.

It is probable that the first Spanish had less impact on the islands than the first English colonists. There were fewer Spanish and their cultural practices were not intended to establish towns and farms. The same is true when comparing the French to the English. The Indians told John Wesley, in 1739, (Candler 1904-1916): "The French Black Kings (priests) never go out. We see you go about. We like that. That is good."

Table 1: Important periods of landscape history of Fort Frederica and St. Simons Island, noting alternation of sequences of anthropogenic disturbance and abandonment.

PERIOD	ANTHROPOGENIC DISTURBANCE/ RELEASE	IMPORTANT FACTORS
1) Aboriginal	Mild disturbance, old fields	Primitive agriculture, burning, hunting
2) Spanish mission (late 1500s)	Similar	Introduction of some plant species, larger towns formed, possible population depletion
3) Spanish leave (1680s)	Similar	Succession around towns
4) English settle (1736-40s)	More extensive clearing	Cutting of forests, burning of understories and marshes, clearing around fort, new fields, cattle grazing, new plant introductions
5) Abandonment of fort as military post and of St. Simons during the Revolutionary War (1750s-80s)	Succession around fort	Some agriculture
6) Plantation period	Extensive disturbances	Logging of live oak forests, drainage of ponds and marshes, clearing for cotton, burning to kill vermin, forest fires
7) Abandonment during Civil War (1862-1865)	Succession to pine forests	Little activity
8) Reoccupation by small farmers	Moderate disturbance, pine succession	Logging of mature pines, clearing of fields for oats and corn, hunting

PERIOD	ANTHROPOGENIC DISTURBANCE/ RELEASE	IMPORTANT FACTORS
9) Depression and purchase of lands by Sea Island Company (1920s-1940s)	Increase in succession to pines and oak	Some timber harvest, limited agriculture in small plots
10) Development for recreation, housing	Extensive disturbance on south end of the island	Clearing of land for lawns and building sites, construction of ponds, drainage of marshes, limited logging

The possible presence of exotic animals on the Sea Islands, beginning in Spanish times, has been much discussed as a justification for leaving feral horses and hogs on lands set aside as nature preserves. The settlers on St. Simons do not mention wild pigs or horses as present. Van Reck's diary of 1733-34 (Candler 1904-1916) does, however, list the mainland fauna as including: "Eagles, Wild Turkies, Roe-Bucks, Wild Goats, Stags, Wild Cows, Horses, Hares, Partridges and Buffaloe..." It is possible that the Spanish did not introduce livestock to all of the islands or that hunting by Indians or predation by mountain lions or bears had reduced the numbers of feral animals. Since the English at Frederica suffered periodic food shortages, if wild swine or cattle had been at all common, it seems likely the settlers would have mentioned feral animals as an alternate food source. (Alligators are mentioned as an emergency food supply.) There can be no doubt the English introduced feral animals on St. Simons, as the Colonial Records report in 1739 that "Cattle & Hoggs thrive there, but they run wild into the woods and are frequently lost."

3) Spanish abandonment. After the Spanish left St. Simons, there was a half century when the island was again managed by the Indians. Presumably the patterns of agriculture changed little, thus the effect of man on the landscape during these first three periods was similar.

4) English settlement. The English established the town of Savannah in 1733. The first landing party arrived at the site of Fort Frederica in 1736. As found by this study, the reports written during the 1730's and 40's contain far more botanical detail than anything written either the century and a half before the English arrived or the century and a half after the abandonment of Frederica as a military post.

The Colonial records contain numerous references to the Indians, many of which deal with social or political issues. There are a few references to agricultural practices, however, and the fact that the coastal tribes burned forested lands is well documented. Francis Moore (Candler 1904-1916) wrote on February 26, 1736: "there were great Fires on the Main over against Frederica...made by the Creek English Indians..." and further reported on March 18: "We daily saw several Smoaks and Fires all along the Shore, which were made by the friendly Indians by Mr. Oglethorpe's Order." The settlers apparently also burned freely. Moore noted that when they first landed on St. Simons they fired the spot where the sloop first came in and thus, "destroyed all Vermin, and made the Country round clear, as not to be only pleasant to the Eye, but convenient for walking." Moore also stated that when a Mr. Hermsdorf landed on the main land he "made great Fires in different Places" and did the same on St. George's Island on the north end of Talbot Island where he set "all the Wood on Fire." Van Reck, writing in 1734 (Candler 1904-1916) noted that on the main land "the Country is so good, that one may ride full gallop 20 or 30 Miles on end." This infers extensive burning of the forest understories by the Indians, since fire was probably the only disturbance that could have achieved this open effect and the English did not become established until 1733. Francis Moore may also be describing a burned site when he mentions Amelia Island and says his party left the sea shore and crossed fresh water to "a Ground where there were but a few straggling Pine-Trees, the Land being clear for half a Mile round and thick of Shrubs and Palmettoes..." This is very similar to burned oak and pine scrub currently found on Cumberland Island (author's observations).

The English colonists found scattered old fields present when they arrived and the site of Frederica was, according to Francis Moore, "...in the middle of an Indian Field, where our People found thirty or forty acres of Land cleared by them." Moore also recorded, as part of an expedition to Jekyll Island just south of St. Simons, that on using a creek to get to the heart of the island, they found "...a large field of rich ground; formerly cleared by the Indians." An Englishmen named Hilton, who visited the coast in 1663, wrote: "The Indians plant the worst lands because they cannot cut down the timber in the best..." (Cate 1979). (The Indians actually farmed the best lands on the islands, but presumably had observable difficulty cutting trees.) Moore reports, "In the Fort also are some fine large Oakes preserved for shade...." These references infer the Indians did not completely clear their fields.

Among the most interesting colonial observations are those that describe the woods on St. Simons. John Wesley, (who with his brother Charles founded the Methodist church) wrote of the vegetation of the coast, just as he fled the Colony of Georgia in 1739 (Candler 1904-1916):

> The Land is of four Sorts, Pine-Barren, Oakland, Swamp and Marsh. The Pine-Land is of far the greatest Extent, especially near the Sea-Coasts. The Soil of this, is a dry, whitish Sand, producing Shrubs of several sorts, and between them a spiny, coarse Grass, which Cattle do not love to feed on. But here and there is a little of a better Kind, especially in the Savannahs (so they call the low, watry Meadows, which are usually intermixt with Pine-Lands). It bears naturally two Sorts of Fruit, Hurtle-Berries (much like those of England) and Chincopin-Nuts;...
>
> Oak-Land commonly lies in narrow streaks between Pine-Land and some Swamp, Creek or River. The Soil is blackish Sand, producing several Kinds of Oak (tho' none exactly like the English) Bay, Lawrel, Ash, Walnut, Sumac-Trees, Gum-Trees (a sort of Sycamore) Dog-Trees (cover'd in Spring with large white Flowers) and Many Hickary-Trees, which bear a bad Kind of Walnut. In the moistest Part of this Land, some Porsimmon-Trees grow, (which bear a sort of yellow, clear, lucious Plum) and a few Mulberry and Cherry-Trees. The common Wild-Grapes are of Two Sorts,....
>
> Wesley says specifically of St. Simons:
>
> On the West-side of it, on a low Bluff, stands Frederica, having Woods to the North and South; and to the East partly Woods, Partly Savannahs, and partly Marshes. The Soil is mostly a blackish Sand. There is not much Pine-Land on the Island; the greatest part being Oak-Land, intermixt with many Savannahs, and old Spanish or Indian Fields.

These observations were confirmed by Francis Moore in 1736 (Candler 1904-1916), when he noted, "The Woods on the Island are chiefly Live-Oak, Water-Oak, Lawrel, Bay, Cedar, Gum and Sassafras and some Pines." This is in strong contrast to both pre-Civil War descriptions and the current situation, where pine woods dominate the entire north end of St. Simons.

COLONIAL FORESTS

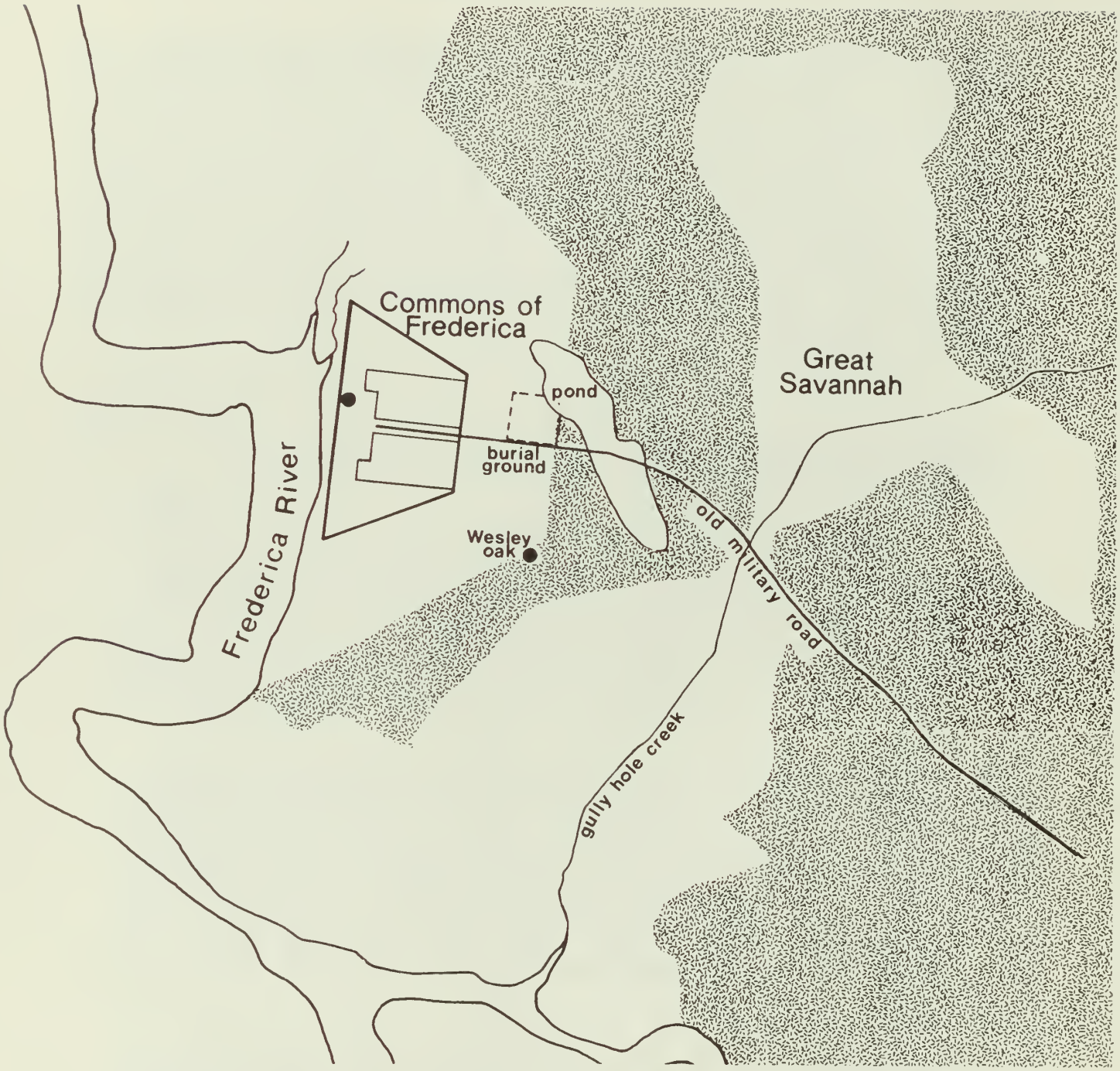

Fig. 2a. The forests around Frederica just after occupation by the English. Note the clearing of the commons. The forests were dominated by live oaks and hardwoods at this time.

PLANTATION FORESTS

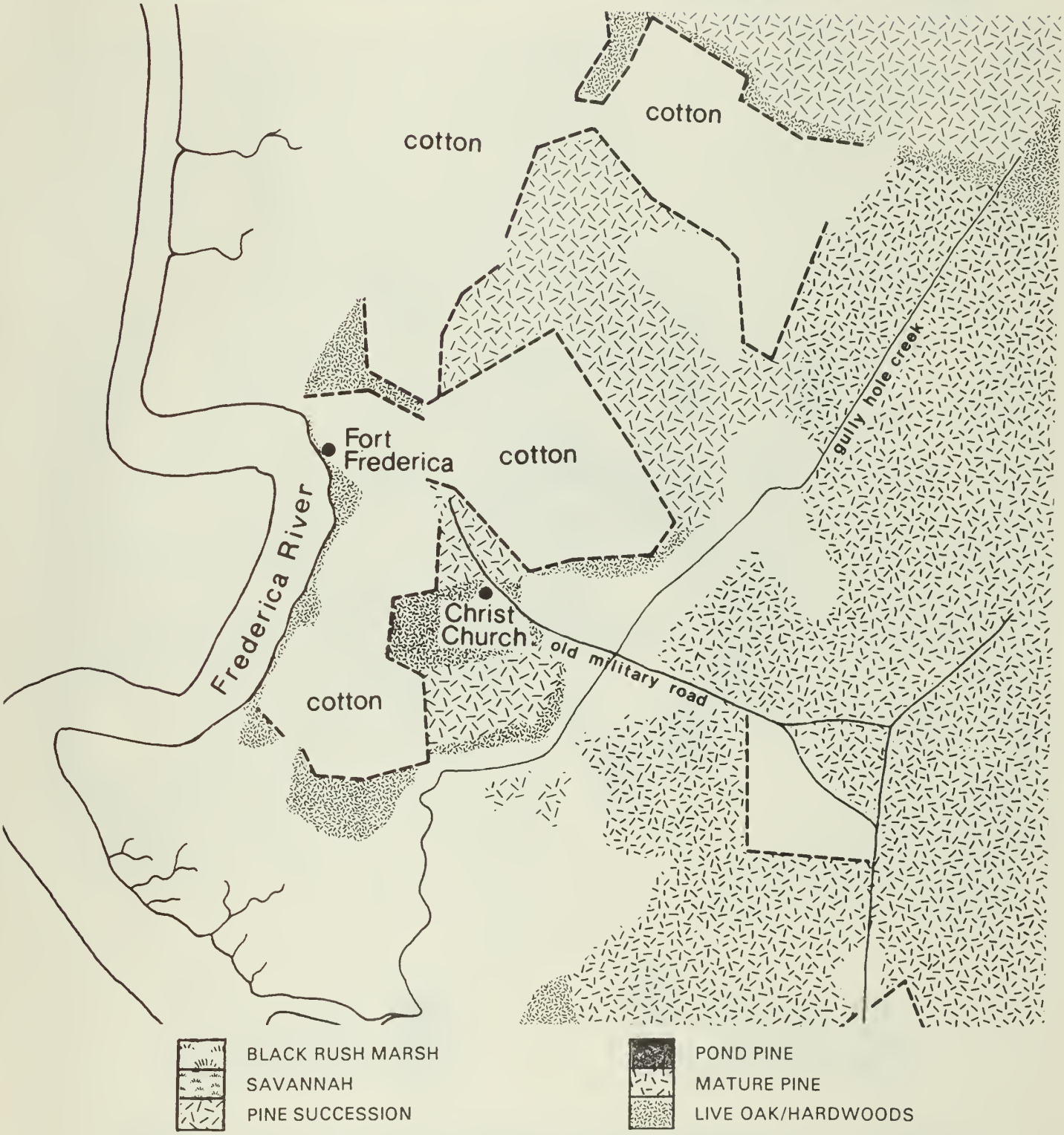

Fig. 2b. Fort Frederica before the Civil War. Much of the area has been cleared for cotton. Note the radical change to pine forest except around the church and along some of the field boundaries. The land was in shifting cultivation during this period.

1930's FORESTS

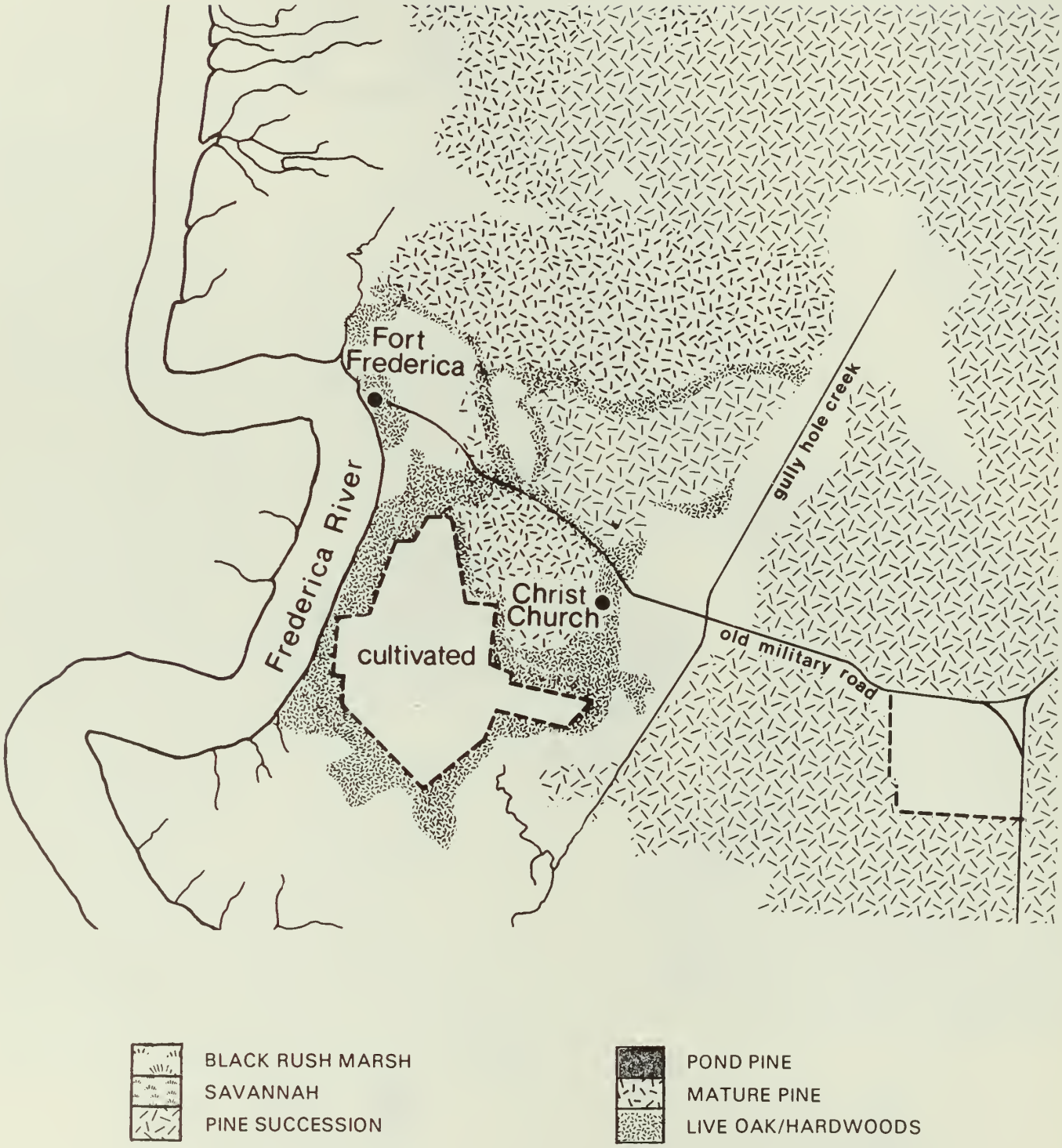

Fig. 2c. Fort Frederica during the 1930's. Most of the agricultural fields have been abandoned, and just the north end of the fort is still under cultivation. Successional pine is the predominant forest type. The areas marked as hardwood include both older live oak and some younger successional thickets at the edge of the marshes.

CURRENT FORESTS

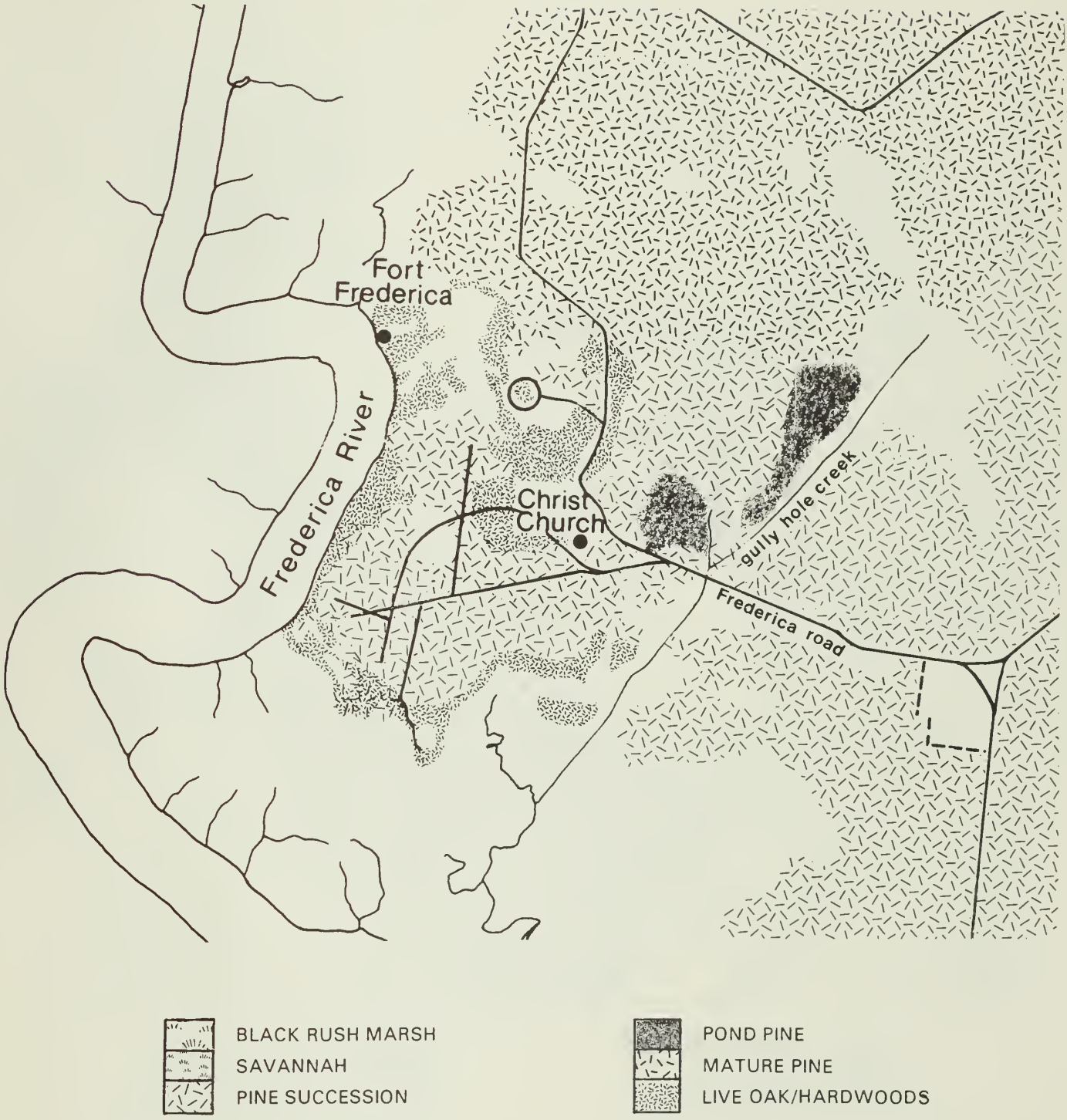

Fig. 2d. Fort Frederica in 1978. Most of the area around the fort is occupied by forest and by wooded house sites. Note the pond pine invasion at the edges of the Great Savannah. They are markers as hardwoods on the southwest side of the Savannah is successional, whereas the remainder of the hardwood forest shown is mature, if somewhat disturbed evergreen oak hardwood.

COLONIAL WETLANDS

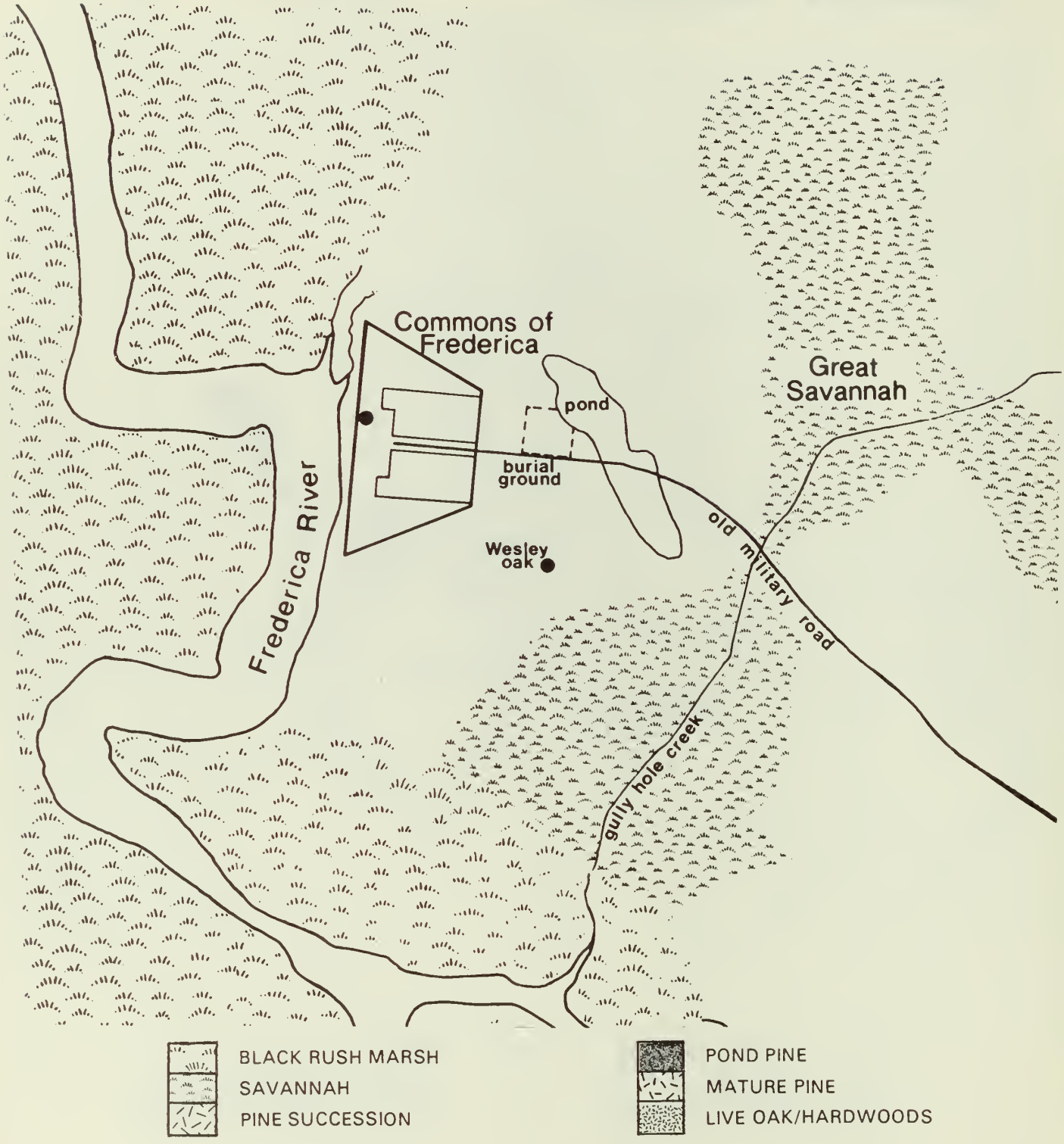

Fig. 3a. Fort Frederica in the colonial period (from a 1796 map). Note the extent of the Great Savannah and the pond just outside the fort walls.

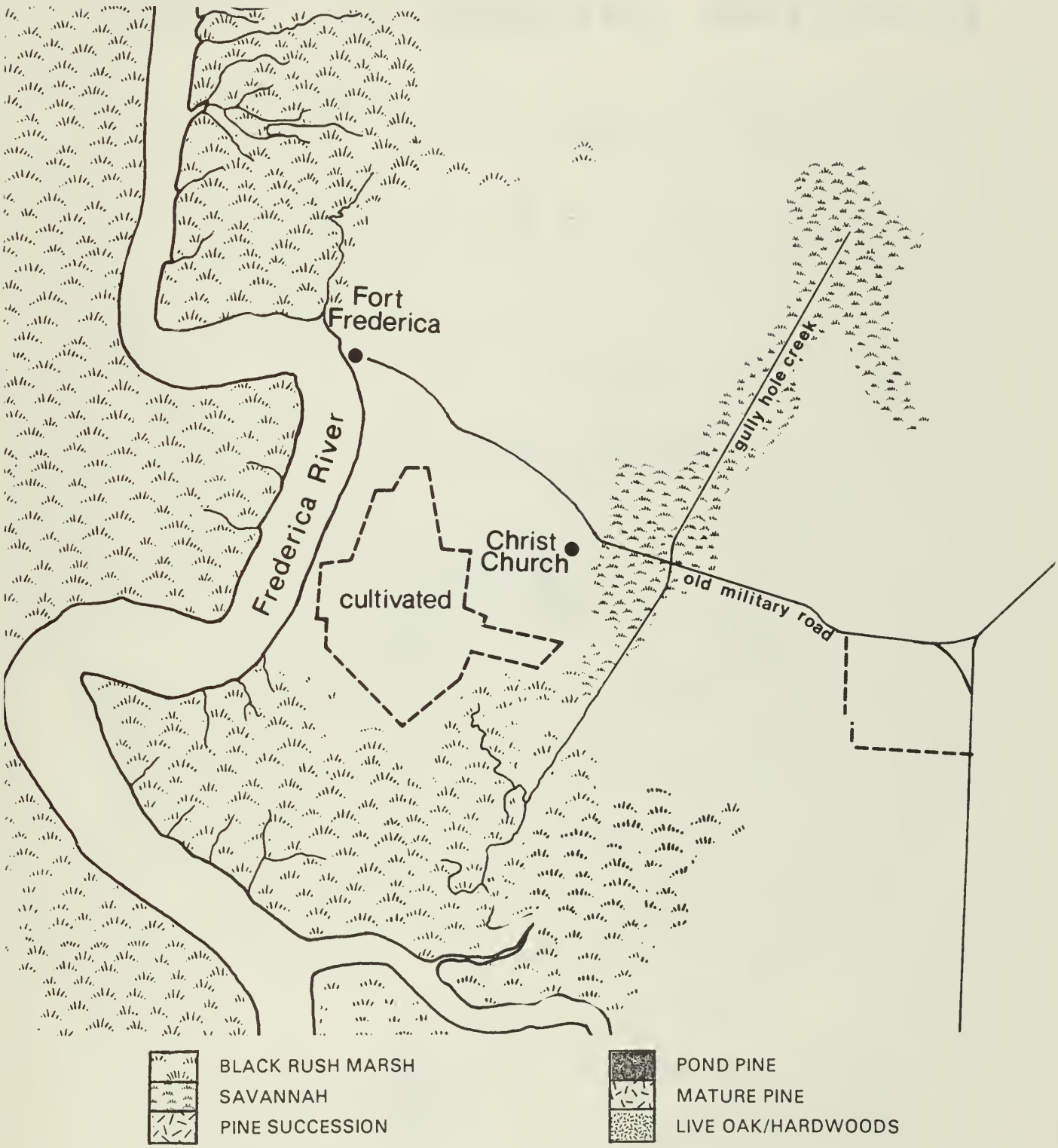

Fig. 3b. Fort Frederica prior to the Civil War. Note the loss of the pond near the fort and the decreasing size of the Great Savannah. Gully Hole Creek has been channelized and other modifications made in drainage.

PLANTATION WETLANDS

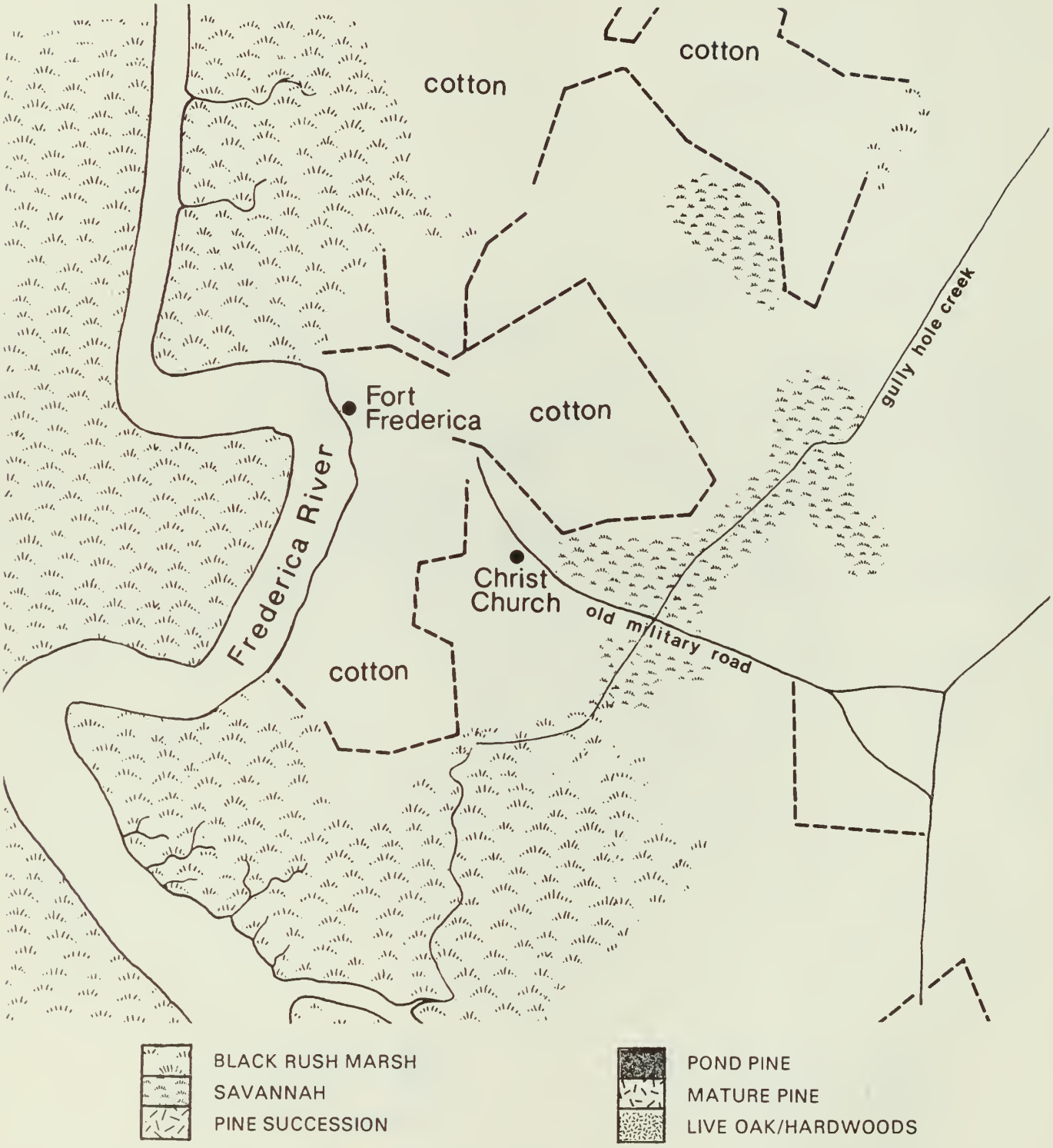

Fig. 3c. Fort Frederica during the early 1900's. Most of the fields have been abandoned and succession increasing the forested area. Interior wetlands are continuing to shrink.

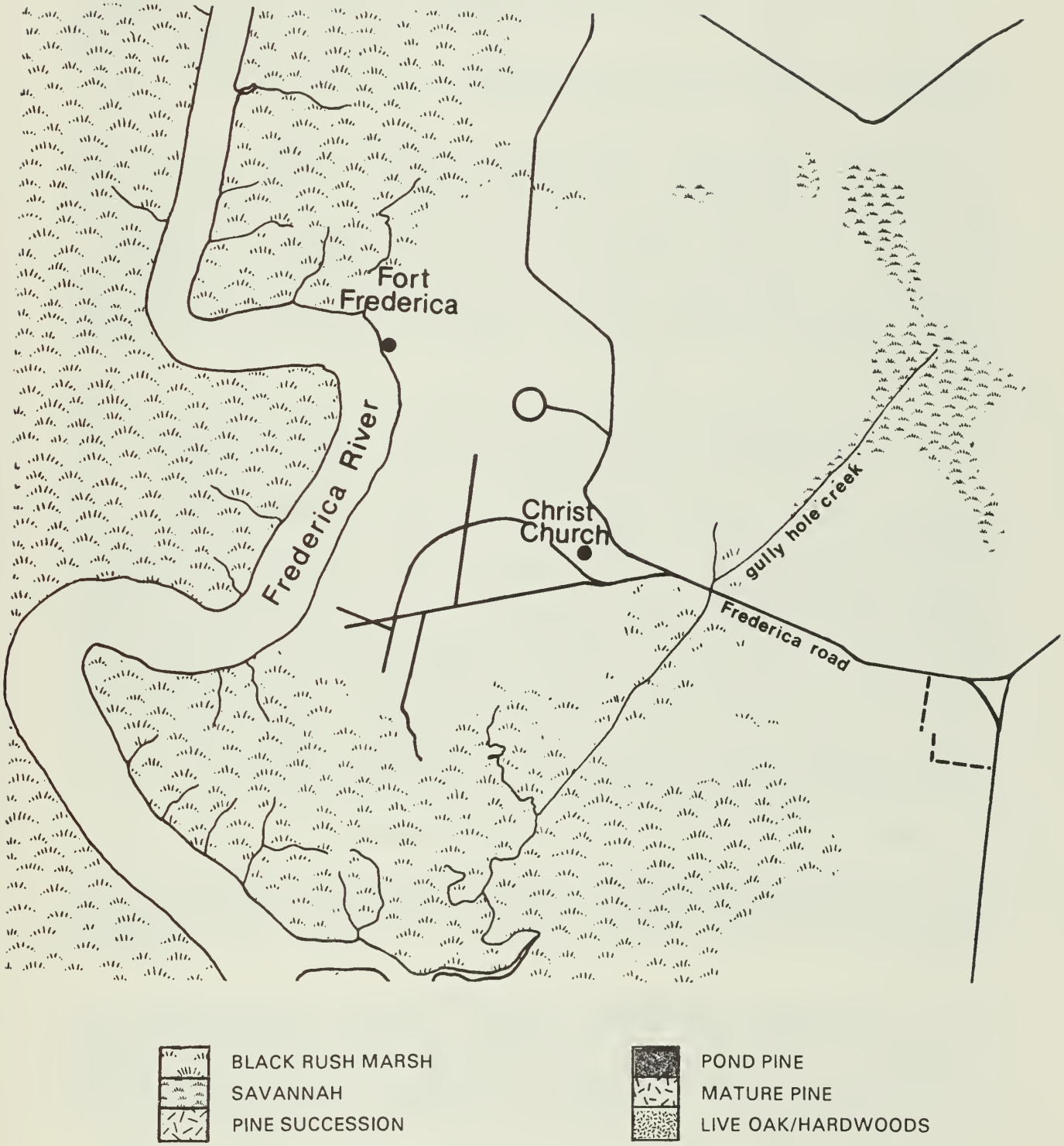

Fig. 3d. Fort Frederica in 1978. The Great Savannah is almost gone. Very little open freshwater marsh remains.

A third source in the Colonial Records, reporting on the progress of the town of Frederica, says, "...That Pine trees are an hundred and thirty or forty feet high That the Live Oak trees are fifteen feet before You come to Branches, and are sixty feet in heighth. That the Wood on St. Simon's is chiefly Live Oak" (Candler 1904-1916) (Fig.2).

Another interesting characteristic of the colonial records is their outline of the positions of marshes and savannahs. A 1796 map was located that showed the boundaries of the "Great Savannah" to the east of the Fort and a small pond near the "Burying Ground" just outside the fort walls (Fig. 3a). The Great Savannah is presently much smaller and the pond is now shown on later maps, including a coastal chart, probably drawn prior to the Civil War (Fig. 3b). Property maps dated 1801 and 1835 show several ponds and wetlands east of the Great Savannah. These small ponds are also no longer present (See Cate 1979 for reduced copies of the 1796, 1801 and 1835 maps).

The Great Savannah is described several times in written records. Francis Moore reported in 1736 that beyond the woods to the east of the fort "is a large Savannah where there is fine Food for Cattle." John Wesley got lost in the woods during his stay on the island and finally reoriented when he found himself on the edge of the Great Savannah. The Savannah is variously described as being 200 acres and over one mile across. Tradition has it that when one stood in front of the Ogelthorpe cottage which was somewhere on the east side of the Great Savannah, one could look to the west across the meadow and have a full view of the town and the fort (Reese 1969, Cate 1979). Moore reported that the small wood to the east of the Fort "which hindered the town from seeing the Savannah..." was cut in 1739. The colonial sources, therefore, imply that with a minimum of clearing, it was possible to see over a mile across the marsh. In 1981, in the line of sight from the most probable sites for the Oglethorpe house (the exact location is not known), trees blocked all but a few open patches along Gully Hole Creek (see Fig. 3a, d).

The major activities of the colonists included:

a) Construction of the fort. They cut cedars and pines to form battlements which were filled with earth and sodded with the grassy turf from the Indian old field where the fort stood. They also dug a moat outside the fort walls.

b) Clearing of the commons. They cut the woods at least 50 yards away from the walls and some diagrams indicate the clearing may have been more extensive. It is likely that the clearing reached beyond the "Burying Ground" which is still present on the fort site. It probably also extended to the south bastion. Fig. 2a shows the probable boundaries of clearing in the first few years of colonization.

During the early colonial period, logging was primarily limited to the immediate needs of the colony. Moore reported in 1739, "To the South is a little Wood of red Bay-trees, Live Oaks, and other useful Timber, which is reserved for Public Service.... To the North are Woods, where the People have leave to cut for Fire and Building, for all that side is intended to be cleared." Further, in a report to the trustees of the colony, the records (Candler 1904-1916) state the timber, of which there was "a great

quantity excellent for building ships," could not be sold for want of a market, and was therefore burned as the fields were cleared.

c) Began cultivation. Although the colonial baliffs complain, in early reports to the trustees, "That not a Man in Frederica will cultivate his Land....," by the early 1740's the soldiers and townspeople had experimented with a wide variety of crops. These included both species grown by the Indians, such as corn and tobacco, and introductions from Europe and from the West Indies. Most of the early farming was in small plots. Captain Mark Carr is reported to have had 50 acres cleared in about 1740, probably representing one of the larger efforts (Candler 1904-1916). Oglethorpe attempted to get the people to plant mulberries for silk production, but this project was never an economic success. The settlers planted vineyards and fruit trees, including oranges and peaches. Hazard, writing in 1825 (reprinted 1974), noted that the ruins of Frederica supported a large "mulbury tree" growing in a well, and grape vines growing over the remains of one of the fort buildings. Since Frederica was the site of a plantation prior to the Civil War, most of the colonial plantings were probably replaced during the 19th century. Ironically, cotton cultivation was tested very early, but was discouraged in favor of silk culture.

5) Abandonment of the town of Frederica. After the end of the 1739-1748 war with Spain, Frederica no longer needed a full garrison and Ogelthorpe's regiment was disbanded. Most of the non-military families also left the town since there were no military personnel left to support their businesses. By 1753, the town was largely abandoned and in 1758 a fire destroyed most of the remaining buildings. St. Simons was raided by privateers and British soldiers during the Revolutionary War. Most of the land around the fort was abandoned during this period and there was little expansion of agriculture (Reese 1969, Cate 1979, Vanstory 1972).

6) The Plantation period. Beginning in the 1790's, agricultural activities on St. Simons started to expand, as did the timber industry. Thayer (1957), quoting a document written by Nathaniel Pendleton written about 1800, reported that the lumber mills at St. Mary's, Georgia were processing "Oaks of all kinds," particularly live oak for ship building, as well as cedars, cypress, hickory, ash, walnut, cherry, mulberry, poplar, chestnut, chinkapen, red bay and pines. The stern post for the ship "Old Ironsides" was supposedly cut from a live oak on the north end of St. Simons.

Although George Whitefield had tried growing annual cotton in Georgia as early as 1740 (Candler 1904-1916, Whitefield's journal), the real beginning of the cotton plantations was somewhat later. In 1767, Col. Wylly planted black seed cotton on Skidaway Island and about 1783, Patrick M'Kay attempted cotton cultivation on Sapelo Island. By 1791, the locals were encouraged by the shipment of 10,000 pounds of Skidaway cotton to England (Turnbull 1917). Torres (1977) stated that Thomas Spalding first grew cotton on St. Simons in 1778 and superior black seed cotton was first grown in the 1780's. By 1790, the decline in indigo prices encouraged further planting of cotton.

Hazard wrote in 1825 that the Sea Islands could produce as much as 300 pounds per acre of cotton, but that 70 pounds was perhaps slightly better

than average for the years 1820-1823. According to Hazard, from 1820 to 1823, 425 persons (mostly slaves) engaged in caring for 1668 acres of cotton, 286 acres of corn, 136 acres of potatoes and 87 acres of peas on St. Simons. The total cultivated area of a little over 3000 acres is hardly the entire upland portion of St. Simons. Several sources note shifting agriculture. Brewer (1927) wrote that, due to the practice of continued clearing, "The cotton belt...represented vast stretches of abandoned fields, which bordered on the annually cleared new grounds." A very detailed coastal chart of St. Simons, published in 1913, but presumably compiled prior to the Civil War (Coast and Geodetic Survey 1913, Coast Chart No. 157) shows most of the upland portions of the island as pine forest. (The map is probably pre-Civil War as it shows extensive cotton fields, most of which were abandoned during the war and were never replanted with cotton; the map is dated 1855-1911). Since hammock lands of live oak, "intermixed with walnut, hickory, cherry, redbay, cedar, white and red oak and some pine..." were preferred for cotton (Thayer 1957), it seems likely that by the 1840s to 1850s most of the uplands on St. Simons had been through one or more rotations of cultivation and had grown back to pines.

One of the most detailed records of the plantation period is the journal of Fanny Kemble, a British actress who married Pierce Butler, owner of the northwesternmost plantation on St. Simons. Her journal describes extensive pine woods and mentions the presence of some oak forest, as well as lines of oaks along drives and streams, and stands of oaks around buildings, including Christ Church (Fig. 2b). In 1839, discussing a trip to a slave settlement on the Butler plantation, she wrote, "On my way I passed some magnificent evergreen oaks,, and some thickets of exquisite evergreen shrubs,... To be sure, these charming spots, instead of being conveniently in the middle of the plantation, are at an out-of-the-way end of it, and so hardly eligible for the one quality desired for the overseer's abode, viz., being central" (Kemble 1961, originally published in England and New York in 1863). This quote implies that very little acreage of oak forest was left on the plantation and most of it was peripheral to the principal cultivated areas.

Fanny Kemble also mentioned fire and burning several times. The first reference is to "an enormous cypress tree which had been burned, stood charred and blackened, and leaning towards the road so as to threaten a speedy fall across it..." The second describes a larger area:

> Last Tuesday (March 19, 1939) I rode through a whole wood of burned and charred trees, cypresses and oaks, that looked as if they had been each of them blasted by a special thunderbolt, and whole thickets of young trees and shrubs perfectly black and brittle from the effect of fire, I suppose the result of some carelessness of the slaves. As this charcoal woodland extended for some distance, I turned out of it, and round the main road through the plantation...
>
> And a few days later:
>
> The day before yesterday (March 25) I took a disagreeable ride, all through swampy fields, and charred, blackened thickets,...the

> woods in one part of the plantation have been on fire for three days, and a whole tract of exquisite evergreens has been burned down to the ground... There has been rain the last two nights.... In the afternoon (March 26) I rode with Mr. (Butler) to look at the fire in the woods. We did not approach it, but stood where the great volumes of smoke could be seen rising steadily above the pines, as they now have continued to do for upward of a week; the destruction of pine timber must be something enormous.

On visiting another plantation, Hamilton, which was in the southwest portion of the island, she writes (March 27):

> All the way along the road (we traversed nearly the whole length of the island) we found great tracts of wood all burned or burning; the destruction had spread in every direction, and against the sky we saw the slow rising of the smoky clouds that showed the pine forest to be on fire still.... We found that there had been a most terrible fire in the Hamilton woods - more extensive than that on our own plantation. It seemed as if the whole island had been burning at different points for more than a week.... I suppose it is impossible to prevent it. The field hands make fires to cook their midday food wherever they happen to be working, and sometimes through their careless neglect, but sometimes, too, undoubtly on purpose, the woods are set fire to by these means. One benefit they consider that they derive from the process is the destruction of the dreaded rattlesnakes that infest the woodland all over the island; but really the funeral pyre of these hateful reptiles is too costly at this price.

Fanny Kemble also attempted to ride to Sinclair's, in the middle of the east side of the island, but found it impossible (March 28) "to penetrate through the charred blackened thickets." On March 30, she rode to Wylly's and Hazzard's near Frederica, and saw further scorched pinewoods. In a letter dated April 2-4 she noted that, "The fire is actually still burning in the woods."

The journal reports two further fires, the latter of which may have been started by the blaze on the main island. The first was a marsh fire (week of April 8):

> I rode yesterday to St. Annie's with Mr. (Butler). We found a whole tract of marsh had been set on fire by the facetious Negro called Pun,... As he was set to work on it, perhaps it was with a view of making it less damp; at any rate it was crackling, blazing, and smoking cheerily, and I should think would be insupportable for the snakes.

The second was on Little St. Simons (Fig. 1), where Fanny Kemble and her party drove with a wagon across the northern tip of the island (April 15):

> The wood through which we now drove was all on fire, smoking, flaming, crackling, and burning round us. The sun glared upon us from the cloudless sky, and the air was one cloud of sandflies

> and mosquitoes.... I walked with the baby in my arms a quarter of a mile, and then was so overcome with the heat that I sat down in the burning, on the floor of ashes, till the wagon came up again. At length we reached the skirt of that tremendous wood, to my unspeakable relief, and came upon the white sand hillocks of the beach.

The total extent of fires recorded for this period of about a month is displayed in Fig. 4.

Fanny Kemble's journal briefly mentions clearing of pine forest for cotton and also mentions the presence of levees ("raised causeways") and of ditches. On Little St. Simons, her party "continued to walk until we came to a ditch in a tract of salt marsh, over which Israel drove triumphantly, and I partly jumped and was partly hauled over."

Aside from clearing upland areas for cotton, the planters apparently drained ponds and wetlands. The pond outside the walls of Frederica, shown on the 1796 map, was not shown on later maps and the site is presently drained by a ditch connected to a system of ditches that move water into Gully Hole Creek. The channelization of the creek itself is clearly indicated on the 1855-1911 coastal chart of St. Simons (see Fig. 3b) and Hazzard (1825) remarked, "In the very thickly wooded parts of the Island of St. Simons near Frederica, are now to be seen many ditches cut in various directions, and in a cotton field, is a place called Oglethorp's gardens, where the tabby foundations of a building, supposed to be a hot house may be traced..." The key on the 1835 map (shown in Cate 1979, although the key is not printed in its original form) states that the ponds on the island are among the best sites for cultivation, once drained. A newspaper article printed in 1880 but referring to the Colonial period (Engel and Stebbins 1974) stated, "The first patch of rice ever raised in Georgia was planted on the marsh just south of the old church, near Frederica, St. Simons." Although this is not as dependable a source as a colonial citation, it is possible that some of the modifications in the Great Savannah were related to attempted rice cultivation as well as to drainage. The general pattern during the Plantation Period was shrinkage or loss of interior wetlands (Figs. 3a through 3d).

The plantations brought many more plant introductions, including ornamentals such as sago palms, and fruit trees, oranges, bananas, dates, olives, pecans, etc. (Hazzard 1825).

7) The period of Civil War abandonment. Although many planters were already having financial problems before the war started, the Civil War brought an abrupt end to cultivation on St. Simons. All the families left the island in 1861 and Confederate troops were withdrawn in February 1862, leaving one resident who stayed at Frederica. Union troops arrived in March 1862 and between April and August of that year brought 500 "contraband" blacks to the island. The blacks planted vegetables in small gardens and harvested local wild foods, such as turtle eggs. In August 1864, 11 black refugees returned to the island and these were followed by others (Heard 1938). Eventually, some former slave owners returned, but without forced labor and financial capital, the reestablishment of large scale agriculture was impossible. General Robert E. Lee wrote in 1876 that

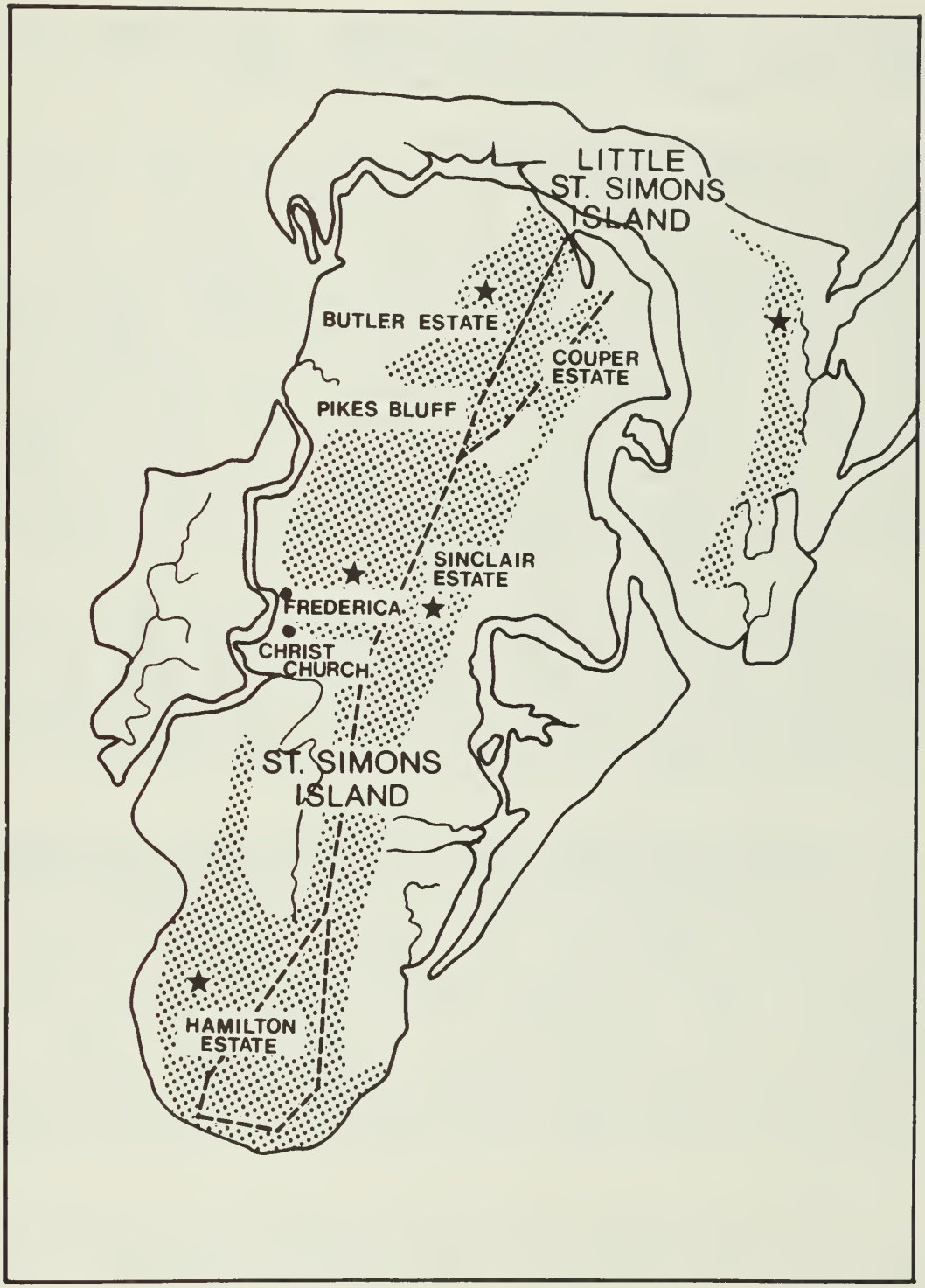

Figure 4. The locations Fanny Kemble described as burning in 1839. The stars show sites mentioned specifically and the shading indicates the projected extent of the fire.

not one acre of Cumberland Island was under cultivation, and also wrote of Jekyll and St. Simons, "The houses have been burned, the fences have rotted and the fields grown up in weeds " (in Torres 1977).

8) Establishment of small farms. Although the trend towards smaller farms had actually started before the Civil War, farm size for coastal Georgia (including the strip of oak lands and marshes on the main land) decreased radically after the war. The average acres per farm was 1030 in 1850 and only 115 acres in 1880 (Table 2). The population rose, while the percent of improved land and the acres of improved land per inhabitant decreased (Harper 1922a, 1922b). Newspaper accounts of St. Simons in the 1880's (Engel and Stebbins 1974) report grains and vegetables, such as oats, rye, corn, sweet potatoes, uplands rice, potatoes, cabbage and cauliflower. The former Hamilton plantation, which had fallen under the ownership of Dodge & Fuller (who owned the St. Simons lumber milling operations), had 100 acres in oats and 50 acres in corn in 1880. Harper (1922b) reported that for the coastal strip as a whole, 30.7% of the land was in corn and only 6.1% in cotton in 1919. The newspaper accounts of the period (Engel and Stebbins 1974) describe figs, olives, bananas, oranges and lemons on the Stevens lot at Frederica.

Beginning in the 1870's, the major industry on St. Simons was harvesting and processing timber. From December 31, 1879 to February 4, 1880, for instance, the mills belonging to Anson Dodge, Sr. processed 3,878,803 board feet of lumber. The primary product was yellow pine. The St. Simons operations milled logs cut on the mainland, but with the mills and a port so close at hand, most of the mature pine on the island was probably cut as well.

9) Economic depression and purchase of land by the Sea Island Company. During the late 19th century, St. Simons began to develop a summer resort trade, including boarding houses, hotels and summer cottages. In 1924, a causeway from Brunswick, on the main land, to St. Simons was opened, making ferry service unnecessary. Two investors, Eugene W. Lewis and Howard Coffin from Detroit, began to purchase tracts of land in 1925. Coffin ultimately formed Sea Island Company and opened the Sea Island resort (Vanstory 1972). Since much of the land they purchased was left undeveloped, several large tracts, including lands across from Fort Frederica, were released from agriculture and logging. Increasing interest in resort development, the economic depression of the 1930's, and the poor financial return of the small family farm encouraged further abandonment of cultivation.

In 1903, the Georgia Society of the Colonial Dames of America repaired the ruins of Fort Frederica and began to manage the property as an historic site. Use of the Fort Frederica property as an active home site and for farming soon ceased completely.

Since the turn of the century, succession has proceeded in the abandoned fields around the fort. Some of the drainage ditches have been maintained, probably encouraging invasion of wetlands by trees and shrubs. Fire suppression has also been actively practiced on St. Simons, possibly further aiding succession in interior wetlands (Fig. 3a-d). By the 1930's the Great Savannah was much smaller than in the Colonial Period.

Table 2: Changes in improved acreage and in farm size for the coastal strip of Georgia, from census data of 1850 to 1880 (Harper 1922a, 1922b).

	YEAR			
	1850	1860	1870	1880
Inhabitants/square mile	24	31	40	45
Inhabitants/farm	102	95	43	32
Percent of land improved	7.9	8.3	6.8	4.9
Improved acres/inhabitant	2.1	1.7	1.0	.6
Average number of acres/farm	1030	885	240	115
Improved acres/farm	211	161	41	20

10) Establishment of the National Monument and development of St. Simons for housing and recreation. After World War II, the economy of the island expanded greatly through establishment of housing developments, including second homes, and recreational facilities. Most of this activity has taken place on the south half of St. Simons and involves clearing of land for buildings and lawns. Since 1945, the US National Park Service has supervised and developed Fort Frederica as a National Monument.

Ironically, these types of development have created some new small ponds and wetlands, either by purposeful blockage of drainage or by accidental impoundment. The present entrance road to Fort Frederica National Monument, for example, has created a small ephemeral pond in a depression across from the park visitor center. As of this writing, new housing was beginning to appear along some of the roads near the fort. Building is likely to further modify drainage.

The Contemporary Vegetation Survey

The vegetation plots indicated that most of the forest on and adjoining the monument property is dominated by loblolly pine. The trees from the older stands are largely 60 to 80 years old (dating by ring counts and increment boring at .5 to 1.3 meters height). The trees in the younger stands are about 30 to 40 years old. Oaks and other broad-leaved species predominate in a few areas, including a narrow strip along the edge of the marsh to the west of the fort, around former house sites and in a stand across from Christ Church. The strip adjoining the marsh and the stand across from the church are shown as wooded on the pre-Civil War coastal chart (Fig. 2b) and may never have been plowed.

Oaks and other broad-leaved species appear as a woody understory in the younger pine stands (Table 3). Laurel oak (Quercus laurifolia) and water oak (Quercus nigra) are more common than live oak (Quercus virginiana) in the pine stands representing succession after cultivation. The older oak stands are slightly more diverse and are dominated by live oak (Quercus virginiana). Some species, such as southern bay (Magnolia virginiana) are scattered and do not immediately invade the younger pine stands. Palmetto (Serona repens) is uncommon in the younger forests.

The data from the 10 x 20 meter plots indicated that basal areas varied from 30 square meters per hectare for the younger pine stands to between 50 and 70 square meters per hectare for older pine stands and pine mixed with hardwoods. A plot in older oak near the "Burying Ground" was estimated at 156 square meters per hectare but this is probably due to the inclusion of several large oaks in a 10 x 20 m plot. More mature live oak stands could realistically have basal areas over 100 square meters per hectare, however.

The 10 x 20 meter plots included samples in vegetation types of very limited distribution. A plot in the ephemeral pond near the Monument visitor center was dominated by blackgum (Nyssa sylvatica), which was 85% of the total basal area. The plot in the old growth oaks near the "Burying Ground" was 65% live oak and 27% laurel oak by basal area. A plot at the edge of the marsh was 35% southern redcedar (Juniperus silicola), 37% sabal

Table 3: The species composition of stands of increasing age near Fort Frederica. Values are percentage of the total basal area of the sampling site. All samples are Bitterlich prism plots.

SPECIES	APPROXIMATE AGE OF STANDS IN YEARS				
	30-40	40-50	70-80	70-100	Older
Pinus	63	63	36	17	7
Quercus					
virginiana	2	0	9	7	29
laurifolia	7	16	16	24	31
nigra	7	6	13	10	9
Liquidambar	19	12	20	28	11
Nyssa	2	1	4	5	2
Vitus	1	+	1	2	1
Other broad - leaved species	0	2	2	2	11
Number of plots	3	4	4	4	3
Average number of species/plot	5.3	5.8	6.5	7.0	7.3

palmetto, and 7% yaupon holly (Ilex vomitoria). Red mulberry (Morus rubra) and hackberry (Celtis laevigata) were both present on the marsh edge, and there were some large live oaks outside the plot. Pine stands had from 50% to 90% basal area of loblolly. (The basal area data from the 10 x 20 m plots give pine a greater portional basal area than the data from the prism plots.) Common understory species in the pine and oak forests included blueberry (Vaccinium spp.), red bay (Persea borbonia), yapoon (Ilex vomitoria), and bay berry (Myrica cerifera). Sassafras albidium, which is mentioned in the colonial records as common, was present but represented by a few scattered individuals.

The edges of the former Great Savannah were not sampled but field investigation found tight thickets of pond pine (Pinus serotina). The northern half of the interior of the town has a few scattered pines, while the southern half supports a mix of loblolly pine, live and laurel oaks and sweet gum (Liquidambar styraciflua). Large oaks and pines are presently growing in the moat outside the old fort walls.

The oldest trees within the town could not be aged since they were hollow at the center. Sound pines, pecans (Carya illinoensis), oaks and sweet gums were cored at 1.3 m height. Some projections may be made about the age of the individuals within the fort. The largest pine in the most was hollow at the center but gave a ring count of 134 years. This pine must actually be 20 to 50 years older than this, implying it sprouted before the Civil War. The pecans that were dated gave ring counts of 50 to 68 years, indicating they must have been planted around the turn of the century. The pecans have shown a strong decline in growth over the last 30 years and may not be competitive with neighboring oaks. The laurel oak cores were more easily read than the live oaks, but both species showed a high rate of trunk growth. The smallest oaks within the fort gave ring counts of 16 to 25 years, although most of the smaller oaks are in the 30 to 35 year range. Again these trees are somewhat older than the ring count at 1.3 meters, but most of the smaller oaks date from about the time of the establishment of the National Monument. In estimating the age of the larger trees, one can project growth rates approaching 16 centimeters of diameter per decade for the first 30 years (plus 5 to 15 years to reach increment boring height). Older trees add wood at a rate of 7 to 15 centimeters per decade and the average for the larger oaks cored is 12.5 centimeters per decade. Thus, there is no reason to assume the largest oak within the fort is more than 200 years old or that it is of Colonial vintage. The largest oak measured 187 centimeters in diameter (and had a hollow center) but was still growing at a rate of 1.2 centimeters a year. This oak was probably planted or allowed to grow during the plantation era and its age is probably about 160 to 180 years. The oaks in the moat look older than they actually are and probably regenerated 60 to 90 years ago. Many of the larger oaks on the lawn are probably roughly contemporary with the pecans.

DISCUSSION

The historic records indicate that the colonists saw a different landscape than is present on St. Simons today. Evergreen oak forest predominated rather than the contemporary pines, and the interior wetlands

were more open and covered a larger area. Although we often think of the period of most radical vegetation change as immediately following settlement, this was not true on St. Simons. The most intensive landscape alteration began about 50 years after settlement, at the beginning of the plantation period when landowners logged the live oak forests, cleared fields for cotton and drained the marshes. This was also the period of maximum human impact on the land, at least at the north end of the island. The vegetation history of St. Simons includes at least three or four cycles of abandonment, including post-Spanish (or Indian), post-garrison (or Revolutionary War), Civil War, and early 20th century. The most major of these was the cessation of farming during the Civil War, but all have had some influence on plant succession.

Although we often think of loss of wetlands as a very modern phenomenon, in the Frederica area, the activities necessary to drain the Great Savannah and some of the local ponds had been completed by 1825. Fire suppression is a more recent factor in encouraging woody plant succession in the interior marshes, but drainage alone was apparently enough to remove many wetlands. Since the Frederica area will probably be subject to more development for housing, drainage and fire suppression are likely to continue. The last remnants of the Great Savannah will be covered with trees within the next few decades.

Central to some of the vegetation changes is the question of fire frequency. The historic records indicate that anthropogenic burning was an important disturbance factor on the island, from the aboriginal period to the Civil War. The records mention largely winter and spring burning (although the records may not be complete), and this is likely since the fires were intended to clear brush and rejuvenate the marshes. The lack of extensive stands of pine when the English settlers arrived probably indicates Indian burning kept the savannahs open but rarely caused a crown fire in the surrounding forests. Live oak forests do not carry fire well, even under exceptionally dry conditions. (During a recent large fire on Cumberland Island [July 1981] the blaze moved quickly into the crowns in the pine forests and oak scrub, but dropped into the understory and then went out when it entered mature evergreen oak stands (observations of Cumberland Island park staff)). The cutting of the oak forests and the pine succession on abandoned cotton fields greatly increased the availability of fuel in the forested stands. Clearing during the plantation period, in combination with continued anthropogenic ignitions by slaves and others, may thus have increased the frequency, area and intensities of fires on the island. This was presumably followed by a decline in fire frequency, particularly with acquisition of land by investors who were interested in development for housing or resort facilities rather than in agriculture or logging.

The historic observations on plant community composition lead to some interesting questions concerning the successional strategies of the dominant trees on the island. The English settlers, for example, observed very few pines, despite the fact there were numerous old fields present and shifting cultivation had been practiced by the Indians. Cultivation during the plantation period, in contrast, definitely initiated pine succession. Was the lack of pines when the settlers arrived the result of the low density of Indian fields? The records state some of the fields were forty

acres or more, and assuming no more than four or five years of cultivation per site, there should have been enough fields on the island to cause noticeable pine regeneration, if the fields succeeded to pine. An alternative hypothesis is that by leaving the live oaks in the fields, the Indian cultivation practices speeded the return of the oaks. The Indians also lacked metal plows and horse-drawn implements, and thus probably caused only superficial disturbance to soils and root systems.

If the colonial records are accurate, the mature live oaks were 60 feet tall and the pines were 130 feet. Although there are some tall pines on St. Simons today, the colonial oak canopy with scattered emergent large pines is gone. Logging during the late 19th century probably removed most of the mature pine trees and left very few individuals of large dimensions.

Another observation is that some species mentioned by early writers are not very common in the contemporary forests. This is true of sassafras and also of persimmon. It is possible the useful qualities of these species made them more important to the settlers and they were therefore frequently recorded. Sassafras is now so sparse around the fort, however, that the apparent difference between colonial times and the present may be due to slow reinvasion of cleared sites by sassafras or the reduction in wetland habitats. Another notable discrepancy is the predominance of laurel oak instead of live oak in the understories of the pine forests. Both laurel and live oak were present in the forest described by the English colonists, and Hazard, writing in 1825, mentioned "a few laurel and immense live oaks..." Today live oak is predominant in the oldest oak forests, but elsewhere laurel oak is the commoner species. Even though the two species are quite similar in appearance, they have different successional strategies and may play different roles in the mature forest canopy. Live oak is slower to reoccupy cleared sites, but may be more tolerant of other major disturbances, particularly storms (John Bozeman, personal communication).

Regarding the landscape around the fort, little of the present vegetation reflects colonial activities. The forests are slowly returning to pre-colonial condition, but the present dominance of pine is the result of both pre- and post-Civil War farming and post-Civil War logging. The pines at the north end of the area enclosed by the town walls are the result of succession after farming. Most of the non-native species inside the walls date from the 19th or early 20th century. The oaks in the moat regenerated during a recent cycle of abandonment, and are, of course, not in their colonial position. The commons is no longer clear, and the pond outside the walls is gone. The density of trees inside the fort is probably greater than it was during colonial times when a few oaks were left for shade. The present landscape, then, is largely the result of management during the last 150 years and has few colonial or pre-colonial elements.

REFERENCES

Brewer, W.M. 1927. Some effects of the plantation system on the Ante-Bellum South. Georgia Hist. Quart. 11:250-273.

Candler, A.D. (ed.) 1904-1916. The Colonial Records of the State of Georgia. 25 vol. Athens, GA: University of Georgia Press.

Cate, M.D. 179. Our Todays and Yesterdays: A Story of Brunswick and the Coastal Islands. Spartanburg, SC: The Reprint Co.

Engel, B. and G. Stebbins (eds.) 1974. Pages from the Past: St. Simons Island 1880-1886. Jessup, GA: Sentinel Press.

Fairbanks, C.H. 1956. The excavation of the Hawkins - Davison houses, Frederica National Monument, St. Simons Island, Georgia. Georgia Hist. Quart. 40:213-229.

Harper, R.M. 1922a. Development of agriculture in lower Georgia from 1850 to 1880. Georgia Hist. Quart. 6:97-121.

Harper, R.M. 1922b. Development of agriculture in lower Georgia from 1890 to 1920. Georgia Hist. Quart. 323-354.

Hazard, W.W. 1825. St. Simons Island, Georgia, Brunswick and Vicinity: Description and History. (reprinted 1974 ed. by V.S. Wood). Belmont MA. Oak Hill Press.

Heard, G.A. 1938. St. Simons Island during the War Between the States. Georgia Hist. Quart. 22:249-272.

Kemble, F.A. 1961 (originally published, 1863). Jounral of a Residence on a Georgia Plantation in 1838-1839. ed. by J.A. Scott. New York: New American Library.

Radford, A.E., H.E. Ahles and C.R. Bell. Manual of the Vascular Flora of the Carolinas. Chapel Hill, NC: University of North Carolina Press.

Reese, T.R. 1969. Frederica: Colonial Fort and Town: Its Place in History. St. Simons: Fort Frederica Association.

Thayer, T. (ed.) 1957. Nathaniel Pendleton's "Short account of the Sea Coast of Georgia in respect to agriculture, ship-building, navigation and the timber trade." Georgia Hist. Quart. 41:70-81.

Torres, L. 1977. Historic Resource Study Cumberland Island Seashore and Historic Structure Report of the Dungeness Area. (off-set) Report to the National Park Service.

Turnbull, N. 1917. The beginning of the cotton cultivation in Georgia. (originally written 1799). Georgia Hist. Quart. 1:39-45.

Vanstory, B. 1970. Georgia's Land of the Golden Isles. Athens: University of Georgia Press.

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